

Textbook Alignment to the Utah Core – 9th Grade Earth Systems

*This alignment has been completed using an “Independent Alignment Vendor” from the USOE approved list
(www.schools.utah.gov/curr/imc/indvendor.html.) Yes _____ No _____*

Name of Company and Individual Conducting Alignment: _____

A “Credential Sheet” has been completed on the above company/evaluator and is (Please check one of the following):

☐ On record with the USOE.

☐ The “Credential Sheet” is attached to this alignment.

Instructional Materials Evaluation Criteria (name and grade of the core document used to align): 9th Grade Earth System Core Curriculum

Title: _____ ISBN#: _____

Publisher: _____

Overall percentage of coverage in the *Student Edition (SE)* and *Teacher Edition (TE)* of the Utah State Core Curriculum: _____%

Overall percentage of coverage in *ancillary materials* of the Utah Core Curriculum: _____%

STANDARD I: Students will understand the scientific evidence that supports theories that explain how the universe and solar system developed.

Percentage of coverage in the *student and teacher edition* for Standard I: _____%

Percentage of coverage not in student or teacher edition, but covered in the *ancillary material* for Standard I: _____%

OBJECTIVES & INDICATORS

Coverage in *Student Edition (SE)* and *Teacher Edition (TE)* (pg #'s, etc.)

Coverage in *Ancillary Material* (titles, pg #'s, etc.)

Not covered in TE, SE or ancillaries ✓

Objective 1.1: Describe the big bang theory and evidence supporting it.

a.	Determine the motion of a star relative to Earth based on a red or blue shift in the wavelength of light from the star.		
b.	Explain how evidence of red and blue shifts is used to determine whether the universe is expanding or contracting.		
c.	Describe the big bang theory and the red shift evidence that supports this theory.		
d.	Investigate and report how science has changed the accepted ideas regarding the nature of the universe throughout history.		
e.	Provide an example of how technology has helped scientists investigate the universe.		
Objective 1.2: Relate the structure and composition of the solar system to the processes that exist in the universe.			
a.	Compare the elements formed in the big bang (hydrogen, helium) with elements formed through nuclear fusion in stars.		
b.	Relate the life cycle of stars of various masses to the relative mass of elements produced.		
c.	Explain the origin of the heavy elements on Earth (i.e., heavy elements were formed by fusion in ancient stars).		
d.	Present evidence that the process that formed Earth's heavy elements continues in stars today.		
e.	Compare the life cycle of the sun to the life cycle of other stars.		
f.	Relate the structure of the solar system to the forces acting upon it.		
STANDARD II: Students will understand that the features of Earth's evolving environment affect living systems, and that life on Earth is unique in the solar system.			
Percentage of coverage in the <i>student and teacher edition</i> for Standard II: _____ %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard II: _____ %	

OBJECTIVES & INDICATORS		Coverage in <i>Student Edition</i>(SE) and <i>Teacher Edition</i> (TE) (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ✓
Objective 2.1: Describe the unique physical features of Earth's environment that make life on Earth possible.				
a.	Compare Earth's atmosphere, solar energy, and water to those of other planets and moons in the solar system.			
b.	Compare the conditions that currently support life on Earth to the conditions that exist on other planets in the solar system.			
c.	Evaluate evidence for existence of life in other star systems, planets, or moons, either now or in the past.			
Objective 2.2: Analyze how ecosystems differ from each other due to abiotic and biotic factors.				
a.	Observe and list abiotic factors (e.g., temperature, water, nutrients, sunlight, pH, topography) in specific ecosystems.			
b.	Observe and list biotic factors (e.g., plants, animals, organic matter) that affect a specific ecosystem (e.g., wetlands, deserts, aquatic).			
c.	Predict how an ecosystem will change as a result of major changes in an abiotic and/or biotic factor.			
d.	Explain that energy enters the vast majority of Earth's ecosystems through photosynthesis, and compare the path of energy through two different ecosystems.			
e.	Analyze interactions within an ecosystem (e.g., water temperature and fish species, weathering and water pH).			
f.	Plan and conduct an experiment to investigate how abiotic factors influence organisms and how organisms influence the physical environment.			
Objective 2.3: Examine Earth's diversity of life as it changes over time.				
a.	Observe and chart the diversity in a specific area.			
b.	Compare the diversity of life in various biomes specific to number of species, biomass, and type of organisms.			
c.	Explain factors that contribute to the extinction of a			

	species.			
d.	Compare evidence supporting various theories that explain the causes of large-scale extinctions in the past with factors causing the loss of species today.			
e.	Evaluate the biological, esthetic, ethical, social, or economic arguments with regard to maintaining biodiversity.			
STANDARD III: Students will understand that gravity, density, and convection move Earth's plates and this movement causes the plates to impact other Earth systems.				
Percentage of coverage in the <i>student and teacher edition</i> for Standard III: _____ %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard III: _____ %		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition (SE)</i> and <i>Teacher Edition (TE)</i> (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ✓
Objective 3.1: Explain the evidence that supports the theory of plate tectonics.				
a.	Define and describe the location of the major plates and plate boundaries.			
b.	Compare the movement and results of movement along convergent, divergent, and transform plate boundaries.			
c.	Relate the location of earthquakes and volcanoes to plate boundaries.			
d.	Explain Alfred Wegener's continental drift hypothesis, his evidence, and why it was not accepted in his time.			
e.	Evaluate the evidence for the current theory of plate tectonics.			
Objective 3.2: Describe the processes within Earth that result in plate motion and relate it to changes in other Earth systems.				
a.	Identify the energy sources that cause material to move within Earth.			
b.	Model the movement of materials within Earth.			
c.	Model the movement and interaction of plates.			

d.	Relate the movement and interaction of plates to volcanic eruptions, mountain building, and climate changes.			
e.	Predict the effects of plate movement on other Earth systems (e.g., volcanic eruptions affect weather, mountain building diverts waterways, uplift changes elevation that alters plant and animal diversity, upwelling from ocean vents results in changes in biomass).			
STANDARD IV: Students will understand that water cycles through and between reservoirs in the hydrosphere and affects the other spheres of the Earth system.				
Percentage of coverage in the <i>student and teacher edition</i> for Standard IV: _____ %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard IV: _____ %		
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Objective 4.1: Explain the water cycle in terms of its reservoirs, the movement between reservoirs, and the energy to move water. Evaluate the importance of freshwater to the biosphere.				
a.	Identify the reservoirs of Earth's water cycle (e.g., ocean, ice caps/glaciers, atmosphere, lakes, rivers, biosphere, groundwater) locally and globally, and graph or chart relative amounts in global reservoirs.			
b.	Illustrate the movement of water on Earth and describe how the processes that move water (e.g., evaporation of water, melting of ice/snow, ocean currents, movement of water vapor by wind) use energy from the sun.			
c.	Relate the physical and chemical properties of water to a water pollution issue.			
d.	Make inferences about the quality and/or quantity of freshwater, using data collected from local water systems.			
e.	Analyze how communities deal with water shortages, distribution, and quality in designing a long-term water use plan.			
Objective 4.2: Analyze the physical and biological dynamics of				

the oceans.				
a.	Describe the physical dynamics of the oceans (e.g., wave action, ocean currents, El Nino, tides).			
b.	Determine how physical properties of oceans affect organisms (e.g., salinity, depth, tides, temperature).			
c.	Model energy flow in ocean ecosystems.			
d.	Research and report on changing ocean levels over geologic time, and relate changes in ocean level to changes in the water cycle.			
e.	Describe how changing sea levels could affect life on Earth.			
STANDARD V: Students will understand that Earth's atmosphere interacts with and is altered by the lithosphere, hydrosphere, and biosphere.				
Percentage of coverage in the <i>student and teacher edition</i> for Standard V: _____ %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard V: _____ %		
OBJECTIVES & INDICATORS		Coverage in <i>Student Edition</i>(SE) and <i>Teacher Edition</i> (TE) (pg #'s, etc.)	Coverage in <i>Ancillary Material</i> (titles, pg #'s, etc.)	<i>Not covered in TE, SE or ancillaries</i> ✓
Objective 5.1: Describe how matter in the atmosphere cycles through other Earth systems.				
a.	Trace movement of a carbon atom from the atmosphere through a plant, animal, and decomposer, and back into the atmosphere.			
b.	Diagram the nitrogen cycle and provide examples of human actions that affect this cycle (e.g., fertilizers, crop rotation, fossil fuel combustion).			
c.	Interpret evidence suggesting that humans are influencing the carbon cycle.			
d.	Research ways the biosphere, hydrosphere, and lithosphere interact with the atmosphere (e.g., volcanic eruptions putting ash and gases into the atmosphere, hurricanes, changes in vegetation).			
Objective 5.2: Trace ways in which the atmosphere has been altered by living systems and has itself strongly affected living				

systems over the course of Earth's history.				
a.	Define ozone and compare its effects in the lower and upper atmosphere.			
b.	Describe the role of living organisms in producing the ozone layer and how the ozone layer affected the development of life on Earth.			
c.	Compare the rate at which CO ₂ is put into the atmosphere to the rate at which it is removed through the carbon cycle.			
d.	Analyze data relating to the concentration of atmospheric CO ₂ over the past 100 years.			
e.	Research, evaluate, and report on international efforts to protect the atmosphere.			
STANDARD VI: Students will understand the source and distribution of energy on Earth and its effects on Earth systems.				
Percentage of coverage in the <i>student and teacher edition</i> for Standard VI: _____ %		Percentage of coverage not in student or teacher edition, but covered in the <i>ancillary material</i> for Standard VI: _____ %		
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Objective 6.1: Describe the transformation of solar energy into heat and chemical energy on Earth and eventually the radiation of energy to space.				
a.	Illustrate the distribution of energy coming from the sun that is reflected, changed into heat, or stored by plants.			
b.	Describe the pathways for converting and storing light energy as chemical energy (e.g., light energy converted to chemical energy stored in plants, plants become fossil fuel).			
c.	Investigate the conversion of light energy from the sun into heat energy by various Earth materials.			
d.	Demonstrate how absorbed solar energy eventually leaves the Earth system as heat radiating to space.			
e.	Construct a model that demonstrates the reduction of			

	heat loss due to a greenhouse effect.			
f.	Research global changes and relate them to Earth systems (e.g., global warming, solar fluctuations).			
Objective 6.2: Relate energy sources and transformation to the effects on Earth systems.				
a.	Describe the difference between climate and weather, and how technology is used to monitor changes in each.			
b.	Describe the effect of solar energy on the determination of climate and weather (e.g., El Nino, solar intensity).			
c.	Explain how uneven heating at the equator and polar regions creates atmospheric and oceanic convection currents that move heat energy around Earth.			
d.	Describe the Coriolis effect and its role in global wind and ocean current patterns.			
e.	Relate how weather patterns are the result of interactions among ocean currents, air currents, and topography.			